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Milk yield, dry matter and mineral intake analysis in Gurgaon District of Haryana

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Abstract
A survey was conducted to study Milk yield, Dry matter and mineral intake analysis in Gurgaon District of Haryana. From each of the four blocks, three villages were randomly selected. To have a systematic and planned study, all the blocks were included in the survey. From each block, three villages were randomly selected to have a fairly representative sample. From each village, four categories of farmers i.e. landless, small (having up to five acres of irrigated land), medium (five to ten acres of irrigated land) and large (more than ten acres of irrigated land) and having dairy animals were purposefully selected. In each village, five families under each category were interrogated on the prescribed Performa for this study, thus, making a total of 240 families. Result of the study showed that the body weight of different animals ranged from 490-587 kg and average body weight was 536 kg. The DM intake ranged from 10-15 kg depending upon body weight. The average value was 14.05 kg. Milk yield ranged from 2-18 kg. The average milk yield was 7.46 kg. The requirement of Zn has been recommended as 40 mg/kg [7]. All the animals were consuming much less Zn than its required level. So, it was concluded that 100 percent buffaloes were deficit in Zn feeding. Except 3% buffaloes, Cu intake was sufficiently high to meet the requirement of buffaloes. Iron intake was sufficiently high to meet the requirement of buffaloes. Mn intake was deficient in 13% buffaloes to meet the requirement i.e. 40 mg/kg [7]. 18 percent of animals, irrespective of their milk yield and body weight were receiving less Ca than its requirement. Only 7 percent of the animals were receiving less P. so mineral mixture should be area specific for the optimum production, reproduction and growth.

Keywords: survey, farmers, minerals, DM etc.

1. Introduction
It is estimated that the world food requirement by the year 2050 will be double that of 2010. A significant part of this requirement will emanate from the developing countries, on account of increased human populations, disposable incomes and urbanization. For livestock products, about two-thirds of this increased demand will need to be met by improving the production efficiency of feed, both forages and concentrate feeds. However, in addition to shortage of feed, it is well documented worldwide that imbalanced nutrition is a major factor responsible for low livestock productivity. Balanced nutrition contributes to improving animal output as well as to reducing both the cost of production and the emission of green house gases per unit of animal product. The National Dairy Development Board (NDDB) of India has developed user-friendly computer software for advising milk producers on their doorstep to balance the ration of their lactating animals with the available feed resources and area-specific mineral mixtures. In order to balance rations in the field, 'Nutrition masters' were created. These 'Nutrition masters' have data on the chemical composition of commonly used feed ingredients across various agro-climatic regions and on the nutrient requirements of lactating cows and buffaloes for milk production and other physiological functions, such as maintenance, and pregnancy. Identified officers from the grass-roots implementing agencies (dairy cooperative unions/federations, Non-Government Organizations (NGOs), service providers and producer companies) are trained by the NDDB on the preparation of balanced rations, and they are responsible for training the village-based local resource persons. The programme is implemented on the ground with the help of these resource persons. Feeding a balanced ration can increase net daily income by 10–15 percent for those having one-two cows and/or buffaloes. This is through an increase in milk production and a decrease in the cost of feeding. There is a positive correlation between milk yield, DM intake and mineral intake upto a level of feeding which is called as balanced feeding. Balanced feeding include intake of correct amount of DM, minerals, energy and protein source for optimum growth and production.

Material and Methods

Gurgaon district has four blocks. To have a systematic and planned study, all the blocks were included in the survey. From each block, three villages were randomly selected to have a fairly representative sample. From each village, four categories of farmers i.e. landless, small (having up to five acres of irrigated land), medium (five to ten acres of irrigated land) and large (more than ten acres of irrigated land) and having dairy animals were purposefully selected. In each village, five families under each category were interrogated on the prescribed Performa for this study, thus, making a total of 240 families. The farmers cooperated well in recording body weight, milk yield, feed intake and answering the questionnaire for collection of data.

Intake of minerals

Intake of different minerals was calculated for each milch buffalo using the data of dry matter intake from different roughages and concentrate sources.

Statistical Analysis

The data will be subjected to statistical analysis to draw inferences. Correlation between the variables will be computed as per [8]

Milk Yield

The farmers were generally selling the milk to venders and therefore, had records of daily milk yield of their animals. The information provided by the farmers was relied upon for recording this parameter.

Feed Intake

Daily offer of concentrates, green fodder and dry roughage were verified with the help of spring balance. Usually farmers use a basket (Tokari) to offer the green and dry roughage, The weight of one basketful of green and dry roughage were recorded separately. The total feed offered daily was calculated on the basis of frequency of feeding. On interrogation about residual feed, it was found that farmers with their daily experience were feeding in such quantity that residue left was almost nil. If residue was left, it was generally added to the next day diet.

Live Weight

Live weight of the animals was recorded by measuring chest girth as suggested by [6]. A specially designed measuring tape based upon the following equation was employed in this study.

$Y=0.000027454xCG^{2.7}$

Where Y=Body weight (kg)

CG is the chest girth in centimeters.

Results and Discussion

Intake of minerals

The intake of different minerals was calculated from the data of intake of different ingredients and their minerals composition. None of the minerals could be detected from water and thus, it was ignored for calculation of intake. The average values in a block of Gurgaon district for mineral intake, body weight, and DM intake and milk yield of buffaloes are presented in Table (1 & 2). The data of body weights, milk yields and dry matter intake were also incorporated in this table. The body weight of different animals ranged from 490-587 kg and average body weight was 536 kg. The DM intake ranged from 10-15 kg depending upon body weight. The average value was 14.05 kg. Milk yield ranged from 2-18 kg. The average milk yield was 7.46 kg.

Zinc intake ranged from 18.65-35.73 mg/kg in different milch buffaloes. The average value was 26.14 mg/kg. The average intake ranged from 25.94 to 26.26 mg/kg. The requirement of Zn has been recommended as 40 mg/kg [7]. All the animals were consuming much less Zn than its required level. So, it was concluded that 100 percent buffaloes were deficit in Zn feeding.

The overall intake of Cu from all sources ranged from 8.97-39.14 mg/kg and average value was 25.23±1.36 mg/kg. The average intake ranged from 24.34-26.14 mg/kg [7] had suggested 10mg/kg Cu for dairy cattle for all purpose. Therefore, except 3% buffaloes, Cu intake was sufficiently high to meet the requirement of buffaloes.

Iron intake varied from 142.83-220.25 mg/kg and the average intake was 187.66 against the requirement of 50 mg/kg as suggested by [7]. So iron intake was sufficiently high to meet the requirement of buffaloes. Though Fe absorption is highly regulated depending upon Fe concentration of intestinal mucosal cells but excess dietary Fe may affect the utilization of other minerals as it has interaction with dietary Cu and P at absorption site.

Table 1: Body weight, milk yield and intake of dry matter in different sites of Gurgaon district

Site No.	n	Name of block	B. Wt.(kg)	DM intake(kg)	Milk yield(kg)
1.	60	Gurgaon	536.33±18.01	14.04±0.52	7.34±1.13
2.	60	Pataudi	535.83±23.13	14.05±0.63	7.27±1.61
3.	60	Farrukhnagar	536.36±19.43	14.03±0.46	7.64±1.19
4.	60	Sohna	536.10±20.37	14.05±0.73	7.58±1.37
Mean			536.15±10.45	14.05±0.21	7.46±0.68
Range			490-587	10-15	2-18

± Standard error of mean

Average intake of Mn was 44.32 mg/kg but a great variation (34.57-56.12) existed between individual milch animals. Highest average intake (44.69 mg/kg) was found in Sohna block and the lowest intake (43.72 mg/kg) was found in Gurgaon block. Mn intake was deficient in 13% buffaloes to meet the requirement i.e. 40 mg/kg [7].

Intake of Ca ranged from 25.64-68.30 g while the average value was 46.60 g. Based on 500 kg body weight and 7 kg milk yield the requirement of Ca was 40 g. Therefore, the animals received sufficient quantity of Ca. On critical analysis of data it was revealed that 18 percent of animals, irrespective of their milk yield and body weight were receiving less Ca than its requirement. P intake ranged from 13.60-55.37 g and the average value was 36.23 g. Only 7 percent of the animals were receiving less P.

Table 2: Intake of minerals in different sites of Gurgaon district.

Site No.	n	Name of block	Intake					
			Ca(g)	P(g)	Zn(mg/kg)	Cu(mg/kg)	Fe(mg/kg)	Mn(mg/kg)
1.	60	Gurgaon	46.78±4.84	36.43±3.52	25.94±0.76	24.34±2.46	187.59±7.34	43.72±1.71
2.	60	Pataudi	46.44±3.29	35.96±4.62	26.26±1.08	24.94±1.85	188.44±7.10	44.62±1.97
3.	60	Farrukhnagar	46.56±5.93	36.38±5.71	26.17±0.89	25.52±3.29	187.65±8.20	44.24±1.83
4.	60	Sohna	46.61±4.20	36.15±4.37	26.20±0.93	26.14±2.96	186.98±8.01	44.69±1.92
Mean			46.60±2.46	36.23±3.25	26.14±0.67	25.23±1.36	187.66±6.53	44.32±0.88
Range			25.64-68.30	13.60-55.37	18.65-35.73	8.97-39.14	142.83-220.25	34.57-56.12

± Standard error of mean

[9] Reported that there was deficiency of Ca, P, Zn, Mn, Cu and Fe in feeds and fodder of Rewari district of Haryana state. They reported that bajra stover, wheat straw, cottonseed and wheat grain were deficient in copper. Iron was much higher in all the ingredients than its specified level in ration. The animals of this district need dietary supplementation of these minerals. [5] reported that in Rohtak and Bhiwani district of Haryana state, dry and green fodder are deficient in Zn, Cu, Mn. Concentrates are also deficient in these minerals. Deficient also reflected in serum, hair and milk. They suggested that dietary supplementation of these minerals was needed in these districts [3]. reported that there was significant low level of Cu and Zn while Mn was in good amount in high yielding cattle's diet of Dantiwada taluka in North Gujarat region. To overcome deficiency of Cu and Zn, supplementation level was suggested.

[2] Conducted a study in the Sabarkantha district of Gujarat to assess the status of some macro and micro minerals in lactating buffaloes. They suggested that the ration lactating buffaloes were found to be deficient in Ca, P, S, Cu, Zn and Co. Supplementing the deficient minerals through area specific mineral mixture could alleviate the deficiency and improve productivity and reproduction efficiency of lactating buffaloes. [4] Reported that the levels of certain minerals such as Ca, P, S, Zn, Cu and Co were inadequate in the ration, as per the prevailing feeding practices and requirement of buffalo yielding daily 10 kg milk (6% fat) in the Central Plain Zone of Punjab. [1]Revealed that supplementation of 120% Ca and P in diets of lactating buffaloes increased milk production, milk fat, milk total solids and reproductive performance as compared to 80% and 100% Ca and P supplemented groups. This indicates that minerals supplementation is important to reduce the economic losses due to minerals deficiencies and helpful in increasing the income of farmers. Current study also shows similar type of results.

Conclusion

Thus from this study we can conclude that micro mineral intake as well as micro mineral is lower than the requirement as per the milk production and body weight of the animal. So area specific mineral mixture should be introduced to increase the intake of minerals which are critically low in the feed and fodder of that specific area.

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